

REMARKS

Claims 1 to 3, 5-23 and 25 -28 are now pending in this application.

The Rejection Under 35 U.S.C. §112

Claim 21 is rejected under 35 U.S.C. §112, second paragraph. In particular, the Office Action states that the phrase "elevated pressure" is unclear as to what the pressure is elevated with respect to. Claim 21 is amended herein to clarify that the pressure is above atmospheric. It is submitted that any lack of clarity has been corrected. Reconsideration and withdrawal of the rejection are respectfully requested.

The Rejections Based Upon Prior Art

1. Claims 1-5, 7, 9-13, and 15-24 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Pub. No. 2002/0074263 ("Shan et al. '263").

2. Claims 1-5, 7, 9-13, and 16-24 are rejected under 35 U.S.C. §102(b) as being anticipated by either U.S. Pat. No. 6,358,486 ("Shan et al. '486").

3. Claims 1-5, 7, 9-13, and 16-21 are rejected under 35 U.S.C. §102(b) as being anticipated by WO 00/15551.

4. Claims 1-5, 7, 9-13, and 16-21 are rejected under 35 U.S.C. §102(a, e) as being anticipated by any one of U.S. Pat. No. 6,906,208 ("Shan et al. '208"), 6,814,950 ("Shan et al. '950"), WO 2004/026473, or WO 2004/052537.

5. Claims 1-5, 7, 9-13, and 15-24 are rejected under 35 U.S.C. §102(a, e) as being anticipated by either U.S. Pat. No. 7,084,087 ("Shan et al. '087").

6. Claims 1-3, 5, 7, 9-15, 18, 21 and 22 are rejected under 35 U.S.C. §102(b) as being anticipated by either U.S. Pat. No. 5,418,298 ("Laine et al. '298").

7. Claims 6, 8, and 14 are rejected under 35 U.S.C. §103(a) as being obvious over any one of Shan et al. '263, Shan et al. '087, Shan et al '486, Shan et al. '208, Shan et al. '950, WO 00/15551, WO 2004/026473, or WO 2004/052537 in view of U.S. Pat. No. 5,273,736 ("Nakagawa").

8. Claims 15 and 16 are rejected under 35 U.S.C. §103(a) as being obvious over any one of Shan et al. '263, Shan et al. '087, Shan et al '486, Shan et al. '208, Shan et al. '950, WO 00/15551, WO 2004/026473, or WO 2004/052537 in view of U.S. Pat. No. 5,250,277 ("Kresge et al.").

9. Claims 4 and 17 are rejected under 35 U.S.C. §103(a) as being obvious over Laine et al. '298 in view of Shan et al. '263.

10. Claims 6 and 8 are rejected under 35 U.S.C. §103(a) as being obvious over Laine et al. '298 in view of Nakagawa.

All of these rejections are obviated by the amendments herein. In particular, the method of amended claim 1 includes the recitation of claim 24 (now cancelled) directed to recovering the pore forming agent from the porous material precursor. Claim 1 is amended to additionally recite that the source of inorganic oxide is an inorganic compound and to clarify that the complexing agent is also a pore-forming agent. Claim 4 is correspondingly cancelled. Moreover, claim 1 now recites recycling of organic pore forming agent recovered by solvent extraction and calcining of the inorganic oxide framework.

As former claim 24 was rejected only under Shan et al. '263, Shan et al. '486 and WO 00/15551 (which corresponds to Shan et al. '486), and Shan et al. '087, all other rejections are obviated and only these references need be considered.

Shan et al. '263 is directed to a catalyst containing microporous zeolite in a mesoporous support. The method described therein includes reacting a source of inorganic oxide with a templating agent capable of hydrogen bonding to form a gel, drying the gel, then heating to form a mesoporous oxide structure. Shan et al. '263 differs from the invention claimed herein in at least the following respects.

Shan et al. '263 does not teach the use of inorganic compounds as sources of inorganic oxide. Rather, Shan et al. '263 employs tetraethylorthosilicate (TEOS) or aluminum isopropoxide, both of which are decomposed in the reaction mixture to provide metal oxide. Both of these are relatively expensive organic compounds. An advantage of the present invention is the capability of using relatively inexpensive inorganic compounds as sources of the inorganic oxide such as silica gel, aluminum hydroxide, and magnesium hydroxide, as well as the metal oxides. The present invention employs alkanolamines which function as both complexing agents (at the complexing temperature) and pore forming agents. The alkanolamines are used in Shan et al. '263 only as pore forming agents. Complexing is not performed or required because the starting material is an organic source of the inorganic oxide. Hence, the synthesis procedures of Shan et al. '263 do not include a complexation temperature (i.e., 150 - 250°C), and complexing does not occur.

Secondly, Shan et al. '263 does not teach both recovery and recycling of the pore forming agent in addition to calcining of the inorganic oxide framework, as recited in claim 1. Rather, at paragraph [0028] Shan et al. '263 teaches that calcination can be replaced by solvent extraction. There is no suggestion to use employ both.

Shan et al. '263 neither discloses nor suggests all of the features of claim 1 as amended. Accordingly, reconsideration and withdrawal of the rejection of claim 1, and all claims depending therefrom, as being anticipated by Shan et al. '263 are respectfully requested.

Shan et al. '087 discloses no more than Shan et al. '263 and the comments above with respect to Shan et al. '263 apply with equal force to Shan et al. '087. In particular, Shan et al.

'087 does not disclose an inorganic compound as the source of the inorganic oxide, does not disclose the reaction of the inorganic compound with a reactant functioning as both a complexing and pore-forming agent at a complexing temperature, and does not disclose recovering and recycling of the complexing and pore-forming agent.

Likewise, as illustrated in the Examples, Shan et al. '486 teaches the use of organic precursors of inorganic oxide such as tetraethylorthosilicate (TEOS) and aluminum isopropoxide. Shan et al. '486 does not teach the use of inorganic precursors or sources of the inorganic oxide. Also, Shan et al. '486 does not teach the reaction of the inorganic oxide with complexation agent at a complexation temperature. Likewise, Shan et al. '486 does not teach recovery and recycling of the pore forming agent in addition to calcining of the inorganic oxide framework, as recited in claim 1. The disclosure of WO 00/15551 is similar to that of Shan '486 and also does not teach or suggest all of the features of Applicants' invention as claimed. Claim 1 and all claims depending therefrom are submitted to be allowable over the cited prior art. Reconsideration and withdrawal of the rejections are respectfully requested.

With particular reference to claim 14, none of the cited prior art prior art references discloses or suggests all of the features of the claim. Claim 14 recites that the complexation temperature ranges from about 150°C to about 250°C, and is amended into independent format by incorporating, *inter alia*, the recitations of original claim 1 and the added recitation directed to the X-ray diffraction peak. Laine et al. is directed to the preparation of polymetalloxanes which can be further processed into, for example, ceramics, zeolites or crystalline non-zeolitic materials and discloses a reaction temperature of approximately 100°C to 250°C. Laine et al. is not

directed to the preparation of a mesopore-containing material. As can be seen from Figs. 4 and 5, the X-ray diffraction patterns characterizing the materials produced by the Laine et al. method do not exhibit peaks at 0.3 to 3.5 degrees in  $2\theta$ , and therefore are not equivalent to the inorganic oxide material of Applicants' invention.

Nakagawa also does not disclose or suggest the synthesis of mesopore-containing material. Furthermore, Nakagawa teaches the use of a water soluble templating agent derived from a 9-azobicyclo[3.3.1]nonane. Nakagawa is cited for disclosing a method for making large pore zeolites by reacting inorganic compounds (fumed silica, magnesium hydroxide) with a templating agent at a temperature of 100-235°C. The Office Action states that it would be obvious to combine Nakagawa with any one of Shan et al. '263, Shan et al. '087, Shan et al. '486, Shan et al. '208, Shan et al. '950, WO 00/15551, WO 2004/026473, or WO 2004/052537. There is no motivation for combination of Nakagawa with these references. Nakagawa states at column 2, lines 58-65:

In summary, a variety of templates have been used to synthesize a variety of molecular sieves, including zeolites of the silicate, aluminosilicate, and borosilicate family. However, the specific utility of a given template is at present unpredictable. In fact, the likelihood of any given organocation to serve as an effective templating agent useful in the preparation of molecular sieves is conjectural at best.

One skilled in the art would not find any suggestion to combine the teachings of Nakagawa with the Shan et al. references given that Nakagawa explicitly affirms the unpredictability of the utility of templating agents. Nor can one pick and choose reaction conditions in one field of art (i.e., preparation of molecular sieves) for combination with an unrelated field of art (i.e., preparation of mesoporous inorganic oxides). Accordingly, claim 14 is

submitted to be separately patentable over the cited prior art references. Reconsideration and withdrawal of the rejections of claim 14 are respectfully requested.

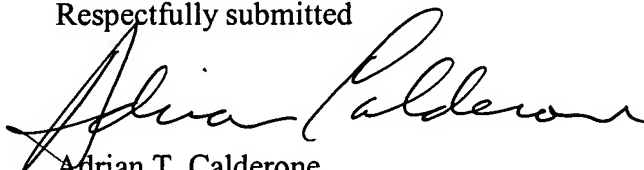
The New Claims

New claims 25 to 28 are added herein. Claim 28 is an independent claim which recites, *inter alia*, a complexing agent and mesopore-forming agent, and that said agent is used in conjunction with a glycol solvent. Claims 26 to 28 depend from claim 25.

CONCLUSION

For at least the reasons stated above all of the pending claims are submitted to be in condition for allowance, the same being respectfully requested.

Respectfully submitted

A handwritten signature in black ink, appearing to read "Adrian T. Calderone". The signature is fluid and cursive, with the first name "Adrian" being more prominent than the last name "Calderone".

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